

What Is Claimed Is:

1. A method for operating an injection system of an internal combustion engine (10) having at least one injection actuator (104) controllable by means of triggering pulses, triggering (215) of the injection actuator (104) being performed on the basis of at least one state variable of the injection system, wherein the at least one state variable is sensed and temporarily stored; the at least one injection actuator (104) is triggered (520) with a triggering pulse of definable pulse duration and definable initial pulse height; during the triggering (520) of the at least one injection actuator (104), an injection detection (525) is performed; the pulse height of the triggering pulse is incremented (535) in definable steps, at the defined pulse duration, until an injection is detected (525); and when an injection is detected, the pulse height of the triggering pulse causing the injection is permanently stored (530) as a function of the sensed state variable, and in future operation of the injection system is taken as the basis for triggering the at least one injection actuator.

2. The method as recited in Claim 1, wherein the pulse height of the triggering pulse causing an injection is permanently stored as a function of the sensed state variable of the injection system only if the state variable varies, in the time interval considered, only within a definable variability (515).

3. The method as recited in Claim 1 or 2, wherein the initial pulse height of the triggering pulse is selected (400) so that no injection yet occurs at the instantaneous value of the state variable.

4. The method as recited in one of the preceding claims, wherein the aforesaid steps are performed for at least two different values of the state variable, and the respectively resulting pulse height of the triggering pulse causing an injection is permanently stored as a function of the respective value of the state variable in a table, a characteristics diagram, or a characteristic curve, and the table or characteristics diagram or characteristic curve is taken as the basis, in future operation of the injection system, for triggering the at least one injection actuator.

5. The method as recited in Claim 4,
wherein the pulse height of the triggering pulse causing an injection is stored in the table or characteristics diagram or characteristic curve in a manner filtered or weighted as a function of the respective value of the state variable.
6. The method as recited in one of the preceding claims,
wherein the state variable of the injection system is constituted by the rail pressure instantaneously present in the injection system or the temperature instantaneously present in the injection system or by sample-to-sample variations of the injection system or its components.
7. The method as recited in one of the preceding claims,
wherein the aforesaid steps are performed only with the internal combustion engine in coasting mode (500-510).
8. The method as recited in one of the preceding claims,
wherein injection detection is accomplished indirectly on the basis of the operating parameters of the internal combustion engine, preferably on the basis of a rotation speed signal and/or a combustion chamber pressure signal and/or a knock signal and/or an ion current signal of the internal combustion engine.
9. The method as recited in one of the preceding claims,
wherein the aforesaid steps are performed cyclically for all combustion chambers of the internal combustion engine.
10. The method as recited in one of the preceding claims,
wherein the ascertained values of the pulse height of the triggering pulse causing an injection are compared with definable target values, and from a deviation resulting therefrom, a correction variable is determined with which the injection system is operated in the future.
11. The method as recited in one of the preceding claims,

wherein the pulse duration of the triggering pulses is selected so that given the prevailing value of the state variable, an injection quantity is implemented that ensures the least possible influence on operation of the internal combustion engine.

12. An apparatus for controlling an injection system of an internal combustion engine (10), the injection system comprising at least one injection actuator (104) controllable by means of triggering pulses, and triggering (215) of the injection actuator (104) being performed on the basis of at least one state variable of the injection system, characterized by first means for sensing the at least one state variable and for temporarily storing the state variable that is sensed; second means (520) for triggering the at least one injection actuator (104) with a triggering pulse of definable pulse duration and definable initial pulse height; third means (525) for performing an injection detection upon triggering the at least one injection actuator (104); fourth means (535) for incrementing the pulse height of the triggering pulse in definable steps at the defined pulse duration; and fifth means (530) for permanent storage of the pulse height of the triggering pulse causing the injection as a function of the sensed state variable, in the event an injection is detected.

13. The apparatus as recited in Claim 12, wherein the fifth means (530) encompasses a comparator by means of which a check is made as to whether the state variable is varying, in the time interval considered, within a definable variability, the pulse height of the triggering pulse causing the injection being permanently stored as a function of the sensed state variable of the injection system only if the comparator ascertains that the state variable is in fact varying, in the time interval considered, within the definable variability.

14. The apparatus as recited in Claim 12 or 13, wherein the fifth means (530) have at least one table, characteristics diagram, or characteristic curve for permanent storage of the pulse height of the triggering pulse causing the injection as a function of the sensed state variable, which height is taken as the basis, in future operation of the injection system, for triggering the at least one injection actuator.

15. The apparatus as recited in Claims 12 through 14,

characterized by sixth means (500-510) for detecting a coasting mode of the internal combustion engine.